REVISED CLAIMS

1. A nuclear fuel dissolution apparatus which comprises a perforated sloping ramp (19) contained within a process chamber (1) for containing solvent for the fuel, a pulsation member (9) which in use creates pulses in solvent in the process chamber (1), the perforations (7) being designed to direct pulses of solvent along and up the ramp (19), and a discharge point (18) for fuel hulls disposed at an upper region of the ramp characterised in that the ramp (19) is made out of flat blades (6) and the perforations (7) of the ramp (19) comprise inclined slits formed between the blades (6).

2. An apparatus of claim 1 in which the ramp (19) is spiral.

3. An apparatus of claim 1 or claim 2 in which the process chamber (1) has an outer side wall which is circular in cross section.

4. An apparatus of any of claims 1 to 3 in which the gradient of the spiral is between 1 and 30 degrees.

5. An apparatus of claim 4 in which the gradient is between 1 and 20 degrees.

6. An apparatus of any of claims 1 to 5 in which the gradient of the spiral in an upper zone thereof is greater than in a lower zone.

7. An apparatus of claim 1 in which the angle between the plane of the blades and the horizontal is between 10 and 60 degrees.

8. An apparatus of claim 1 or claim 7 in which the inclined slits are no more than 10 fuel pin diameters in length.

9. An apparatus of claim 1 in which the blades (6) are made in the form of a trapezium and are fastened by the smaller end to a central blade support within the process chamber (1).

10. An apparatus of claims 1 in which the average width of the blades (6) is between 3 and 5 times the distances between them.

11. An apparatus of claim in which the distance between the plates at the outside wall of the container is 0.4 to 0.8 times the fuel pin diameter.

12 An apparatus of claim 1 in which the pulsation member (9) comprises a pulsation chamber disposed centrally within the process chamber (1).

13 An apparatus of claim 12 in which a neutron absorber is arranged between the pulsation chamber (1) and an inside wall of the annular container.

14. An apparatus of any of claims 1 to 13 which is performed in the reprocessing of nuclear fuel, the method further including reprocessing the dissolved fuel to form a fissile material optionally in the form of a fuel pellet, a fuel pin or a fuel assembly.

15. An apparatus for the treatment of solid articles by liquid, comprising a container having an outer side wall of circular cross section, a spiral ramp (19) located in the container, and a pulsator (9) communicating with a lower part of the container, and also pipe connections for feeding in and removing pieces of fuel pin, solution and gas, characterised in that the ramp (19) is made up of flat blades (6) placed one after another along the spiral and forming between one another inclined slit nozzles and the perforations (7) of the ramp comprise inclined slits between the blades (6).

16. An apparatus of claim 15 in which the gradient of the spiral is between 1 and 30 degrees.

17. An apparatus of claim 16 in which the gradient is between 1 and 20 degrees.

18. An apparatus of any of claims 15 to 17 in which the angle between the plane of the blades and the horizontal plane is between 15 and 60 degrees.

19. An apparatus of any of claims 15 to 18 in which the gradient of the spiral in an upper zone thereof is greater than in a lower zone.

20. An apparatus of any of claims 15 to 19 in which the blades (6) are made in the form of a trapezium and are fastened by the smaller end to a central blade support within the process chamber (1).

21. An apparatus of any of claims 15 to 20 in which the average width of the blades is between 3 and 5 times the distances between them.

22. An apparatus of any of claims 15 to 21 in which the pulsation member comprises a pulsation chamber (9) disposed coaxially within the process chamber (1).

23. A method of dissolving fuel in chopped nuclear fuel pins in an apparatus according to claim 1.

24. A method according to claim 23 wherein the apparatus comprises a perforated sloping ramp (19) contained within a process chamber (1) for containing solvent for the fuel and a pulsation member which in use creates pulses in solvent in the process chamber (1) , the perforations being designed to direct pulses of solvent along and up the ramp, the method comprising loading solvent into the process chamber (1), loading fuel pin pieces onto a lower region of the ramp and creating solvent pulses to transport the fuel pin pieces up the ramp to a discharge point where the cladding hulls are discharged from the ramp.

25. A method of claim 23 which is performed in the reprocessing of nuclear fuel, the method further including reprocessing the dissolved fuel to form a fissile material optionally in the form of a fuel pellet, a fuel pin or a fuel assembly.

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REVISED CLAIMS

1. A nuclear fuel dissolution apparatus which comprises a perforated sloping ramp ~~(19)~~ contained within a process chamber ~~(1)~~ for containing solvent for the fuel, a pulsation member ~~(9)~~ which in use creates pulses in solvent in the process chamber ~~(1)~~, the perforations ~~(7)~~ being designed to direct pulses of solvent along and up the ramp ~~(19)~~, and a discharge point ~~(18)~~ for fuel hulls disposed at an upper region of the ramp characterised in that the ramp ~~(19)~~ is made out of flat blades ~~(6)~~ and the perforations ~~(7)~~ of the ramp ~~(19)~~ comprise inclined slits formed between the blades ~~(6)~~.

2. An apparatus of claim 1 in which the ramp ~~(19)~~ is spiral.

3. An apparatus of claim 1 ~~or claim 2~~ in which the process chamber ~~(1)~~ has an outer side wall which is circular in cross section.

4. An apparatus of any of claims 1 to 3 in which the gradient of the spiral is between 1 and 30 degrees.

5. An apparatus of claim 4 in which the gradient is between 1 and 20 degrees.

6. An apparatus of any of claims 1 to 5 in which the gradient of the spiral in an upper zone thereof is greater than in a lower zone.

7. An apparatus of claim 1 in which the angle between the plane of the blades and the horizontal is between 10 and 60 degrees.

8. An apparatus of claim 1 ~~or claim 7~~ in which the inclined slits are no more than 10 fuel pin diameters in length.

9. An apparatus of claim 1 in which the blades ~~(6)~~ are made in the form of a trapezium and are fastened by the smaller end to a central blade support within the process chamber (1).

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10. An apparatus of claims 1 in which the average width of the blades ~~(6)~~ is between 3 and 5 times the distances between them.

11. An apparatus of claim ~~in~~ which the distance between the plates at the outside wall of the container is 0.4 to 0.8 times the fuel pin diameter.

12 An apparatus of claim 1 in which the pulsation member ~~(9)~~ comprises a pulsation chamber disposed centrally within the process chamber (1).

13 An apparatus of claim 12 in which a neutron absorber is arranged between the pulsation chamber ~~(1)~~ and an inside wall of the annular container.

~~14.~~ An apparatus of any of claims 1 to 13 which is performed in the ~~reprocessing~~ of nuclear fuel, the method further including ~~reprocessing~~ the dissolved fuel to form a fissile material optionally ~~in the~~ form of a fuel pellet, a fuel pin or a fuel assembly.

15. An apparatus for the treatment of solid articles by liquid, comprising a container having an outer side wall of circular cross section, a spiral ramp ~~(19)~~ located in the container, and a pulsator (9) communicating with a lower part of the container, and also pipe connections for feeding in and removing pieces of fuel pin, solution and gas, characterised in that the ramp ~~(19)~~ is made up of flat blades (6) placed one after another along the spiral and forming between one another inclined slit nozzles and the perforations (7) of the ramp comprise inclined slits between the blades (6).

16. An apparatus of claim 15 in which the gradient of the spiral is between 1 and 30 degrees.

17. An apparatus of claim 16 in which the gradient is between 1 and 20 degrees.

18. An apparatus of any of claims 15 to 17 in which the angle between the plane of the blades and the horizontal plane is between 15 and 60 degrees.

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19. An apparatus of any of claims 15 to 18 in which the gradient of the spiral in an upper zone thereof is greater than in a lower zone.

20. An apparatus of any of claims 15 to 19 in which the blades (6) are made in the form of a trapezium and are fastened by the smaller end to a central blade support within the process chamber (1).

21. An apparatus of any of claims 15 to 20 in which the average width of the blades is between 3 and 5 times the distances between them.

22. An apparatus of any of claims 15 to 21 in which the pulsation member comprises a pulsation chamber (9) disposed coaxially within the process chamber (1).

23. A method of dissolving fuel in chopped nuclear fuel pins in an apparatus according to claim 1.

24. A method according to claim 23 wherein the apparatus comprises a perforated sloping ramp (19) contained within a process chamber (1) for containing solvent for the fuel and a pulsation member which in use creates pulses in solvent in the process chamber (1), the perforations being designed to direct pulses of solvent along and up the ramp, the method comprising loading solvent into the process chamber (1), loading fuel pin pieces onto a lower region of the ramp and creating solvent pulses to transport the fuel pin pieces up the ramp to a discharge point where the cladding hulls are discharged from the ramp.

25. A method of claim 23 which is performed in the reprocessing of nuclear fuel, the method further including reprocessing the dissolved fuel to form a fissile material optionally in the form of a fuel pellet, a fuel pin or a fuel assembly.